

41  
DART AEROSPACE LTD

Work Order:

21740

Description: Support (412 Aft)

Part Number:

D2896-1

Dwg: D2896 Rev. A3

Qty:

8

Page 1 of 1

Step	Location	Procedure	By	Date	Qty
1	DC	Issue Traveller Blank size, make (2) D2896-1 Dwg not required	KJ	04.10.18	8
2	PG	Issue P/O: 2006982 Description: D6104-011 Material: 17-4 PH SS (AMS 5643 OR AISI 630) as per Dwg D6104 Material release note required.	KJ	04.10.19	10
3	RG	Receive and Inspect for raw material dimensions. Ensure material release note is attached.	KJ	04/11/2018	10
4	MS	Turn blank for Haas as per Folio FA167	KJ	05/03/03	7
5	QC1	Inspect all dimensions as per Dwg D2896	KJ	05/03/03	14
6	MV	Machine as per Folio FA167	MK/BK	05/05/02	12
7	MV	Turnble & Deburr	MK	05/05/02	12
8	QC1	inspect all dimensions to inspection sheet as per Dwg D2890	MK	05/05/02	12
9	QC3	Inspect dimensions for second check	KJ	05/05/02	12
10	FP	Mask Ø0.625" hole prior to paint	FF	05/05/16	12
11	FP	Powder Coat White (4.3.5.2) per QSI 00543	FF	05/05/16	12
12	QC3	Inspect Powder Coat	MK	05/05/17	12
13	ST	Identify and stack	CJ	05/05/17	12
14	AC	Cost / part <u>279.44</u>	SAC	05/18	12
15	DC	Close W/O <u>279.62</u> Inspect Level 21	KJ	05.05.25	12

Rev	Date	Change	Revised By	Approved
A	01.11.26	Preliminary Issue	EC	
B	02.11.26	Reformat; Added P/O; Added mask hole	KJ	

RELEASE

02.11.26

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Mfg / Design Mgr	Approval QC Inspector
05/05/17	13	stack 6 x Decal-011	Q	05/05/17	6	u	B 05/05/17
05.04.25	5	1 ← 0.325 +0.050 -0.010 0.025 +0.050 -0.010 Allowable Chamfer dimensions as shown. Refs Dims "PE" on INSPECTION SHEET				CP 05.04.25 per QSI 6012	Q 05/05/17

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Design Mgr	Approval QC Inspector
			Initial Design Mgr	Action Description Design Mgr	Sign & Date			
05/03/03	114	one scrap insert broke two scrap bol.00 problems problem fixed	Q	destroy	Q	05/03/03	B	B
			B	hole changed destroy pieces	Q 05/03/03		05/03/03 process	05/03/03
		one piece scrap. the hole was offset off +0.020"	CP 05.03.04	0.020" HOLE OFFSET IS OK. CHAMFER IS 0.275" long ON THESE PARTS. RE-MACHINE TO 0.325 +0.050 -0.010 x 0.075 +0.050 -0.010	Q 05.03.07	Q 05.03.12	B 05/03/07 process	B 05/03/02
		one piece scrap the hole was offset the piece more when	B 05/03/12	fix was sized piece scrap	Q 05.05.12	Q 05.05.12	B 05/05/12	B 05.05.12

PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes  No  DQA:  QA: N/C Closed: \_\_\_\_\_ Date: 05/05/17 Date: \_\_\_\_\_

Call entries

DART AEROSPACE LTD

Work Order: 21740

Description: Support

Part Number: D2896-1

Inspection Dwg: D2896 Rev. A4

Page 1 of 1

Inspect dimensions highlighted on inspection sheet drawing D2896 Rev A4/DSK080 Rev A and record below:

				Recorded Actual Dimensions					
Dim	Min	Max	Go/No Go Gauge	1	2	3	4	By	Date
Lathe Section									
A	3.480	3.485			3.482	3.480	3.484		
B	3.990	4.010			4.001	4.000	4.003		
C	3.825	3.845			3.848	3.841	3.838		
D	0.718	0.738			0.724	0.726	0.724		
E	0.090	0.110			0.104	0.101	0.101		
F	3.705	3.725			3.720	3.720	3.715		
G	1.360	1.380			1.367	1.369	1.373		
H	1.250	1.260			1.256	1.257	1.266		
I	6.490	6.510			6.497	6.500	6.501		
J	0.022	0.042		0.02	0.032	0.032	0.032		
K	0.240	0.260			0.250	0.250	0.250		
L	0.107	0.127			0.117	0.118	0.114		
M									
HAAS Section									
AA	2.152	2.172			2.150	CANNOT MEASURE			
AB	2.340	2.360			2.345	2.355	2.354		
AC	3.550	3.560			3.547	3.560	3.560	OK	(P05.05.04)
AD	3.770	3.790			3.774	3.778	3.777		
AE	0.065 x 0.315	0.085 x 0.335			0.070 x 0.318	0.078 x 0.332	0.080 x 0.323		
AF	1.42	1.48			1.445	1.448	1.450		
AG	0.833	0.853			0.840	0.847	0.845		
AH	0.240	0.260			0.250	0.260	0.250		
AI	0.261	0.266	DT8707		✓				
AJ	0.189	0.194	DT8706		✓	✓			
AK	1.990	2.010			2.020	2.002	2.005	OK	(P05.05.04)
AL	0.625	0.630	DT8709		0.632	0.625	0.625	OK	(P05.05.04)
AM	101.75	105.75	DT8697		100.0	CANNOT MEASURE			
AN	0.053	0.073			0.063	0.063	0.063		
AO	0.927	0.947			0.941	0.935			
AP									
AQ									
Accept/Reject									

Measured by: *ML*  
 Date: 05/05/01

Audited by: *EP*  
 Date: 05/05/02

Rev	and	Changed	Revised by	Approved
A			KJ/RF	

RELEASED

TFT 04.05.27



DART AEROSPACE LTD

Work Order:

21740

Description: Support

Part Number:

D2896-1

Inspection Dwg: D2896 Rev. A4

Page 1 of 1

Inspect dimensions highlighted on inspection sheet drawing D2896 Rev A4/DSK080 Rev A and record below:

				Recorded Actual Dimensions					
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Lathe Section									
A	3.480	3.485		3.482	3.481	3.481	3.481		
B	3.990	4.010		3.997	4.008	4.002	4.001		
C	3.825	3.845		3.814	3.847	3.839	3.835		
D	0.718	0.738		0.726	0.726	0.724	0.725		
E	0.090	0.110		0.106	0.105	0.100	0.100		
F	3.705	3.725		3.720	3.720	3.716	3.715		
G	1.360	1.380		1.372	1.372	1.366	1.367		
H	1.250	1.260		1.250	1.260	1.254	1.260		
I	6.490	6.510		6.500	6.499	6.497	6.500		
J	0.022	0.042		0.032	0.032	0.032	0.032		
K	0.240	0.260		0.250	0.250	0.250	0.250		
L	0.107	0.127		0.118	0.118	0.118	0.118		
M									
HAAS Section									
AA	2.152	2.172		CANNOT MEASURE					
AB	2.340	2.360		2.351	2.350	2.347			
AC	3.550	3.560		3.558	3.558	3.557			
AD	3.770	3.790		3.773	3.783	3.784			
AE	0.065 x 0.315	0.085 x 0.335		0.075 x 0.329	0.079 x 0.328	0.081 x 0.326			
AF	1.42	1.48		1.446	1.443	1.441			
AG	0.833	0.853		0.842	0.842	0.846			
AH	0.240	0.260		0.256	0.250	0.250			
AI	0.261	0.266	DT8707	✓	✓	✓			
AJ	0.189	0.194	DT8706	✓	✓	✓			
AK	1.990	2.010		2.003	2.002	2.005			
AL	0.625	0.630	DT8709	✓	✓	✓			
AM	101.75	105.75	DT8697	CANNOT MEASURE					
AN	0.053	0.073		0.063	0.063	0.063			
AO	0.927	0.947		0.935	0.935	0.934			
AP									
AQ									
Accept/Reject									

Measured by:

ML

Audited by:

EP

Date:

05/05/02

Date:

05/05/02

Rev	Date	Change	Revised by	Approved
A	02-12-13	New Due	KJ/RF	
B	04	Dimension AE changed	KJ/RF	++

RELEASED

5/10/02

## Job Costing Report

Dart Aerospace Ltd.  
HawkesburyOct 18, 2004  
12:35 pm

Work Order No : 0021740  
 Project Name : D2896-1  
 Project For : WK447  
 Work Order Type : Main  
 Main WO Number :  
 House Part Number : D2896-1  
 Description : Support  
 Manufactured : Yes  
 Amount Req'd : 8  
 Amount Done : 0  
 Start Date : 10-18-04  
 Est Finish Date : 11-18-04  
 Act Finish Date :  
 Drawings Reqd : No  
 Ok for Approval :  
 Approval Rec'd :  
 Department Code :  
 Burden Flags : NNNNNNN  
 WO Status : Open  
 Invoice State : Not Invoiced  
 Invoice Date :  
 Invoice Number :  
 Invoice Amount : 0.00  
 Order Entry No :  
 OE Value : 0.00  
 Est Margin : 0.000%  
 Actual Margin : 0.000%  
 \$0 Posted to Finished Goods

	Estimated	Actual	Var. %	Posted	To Post
Material Cost	0.00	0.00	0.00	0.00	0.00
Engineering Hours	0.00	0.00	0.00	0.00	0.00
Engineering Cost	0.00	0.00	0.00	0.00	0.00
Production Hours	0.00	0.00	0.00	0.00	0.00
Production Cost	0.00	0.00	0.00	0.00	0.00
Packaging Hours	0.00	0.00	0.00	0.00	0.00
Packaging Cost	0.00	0.00	0.00	0.00	0.00
OverHead Hours	0.00	0.00	0.00	0.00	0.00
OverHead Cost	0.00	0.00	0.00	0.00	0.00
CNC Hours	0.00	0.00	0.00	0.00	0.00
CNC	0.00	0.00	0.00	0.00	0.00
Misc. Hours	0.00	0.00	0.00	0.00	0.00
Misc.	0.00	0.00	0.00	0.00	0.00
Burden	0.00	0.00	0.00		
Total Cost	0.00	0.00	0.00		
Margin	0.000	0.000			
Selling Cost	0.00	0.00			

	Estimated	Actual
Labour Hrs/Amount Done	0.00	0.00
Profits/(Loss)	0.00	0.00



**ELECTRALLOY**  
175 Main Street  
Oil City, PA 16301  
PHONE: 814-678-4200  
Fax: 814-678-4146

**MATERIAL CERTIFICATION  
REPORT and CERTIFICATE  
OF QUALITY CONFORMANCE**

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without the written approval of Electralloy

**CUSTOMER NAME AND ADDRESS**

Copper & Brass Sales  
Accounts Payable  
P.O. Box 5116  
Southfield, MI 48086-5116

CUSTOMER ORDER NO. C89254

IDENTIFICATION Heat # 39789

P  
S

PRO  
DE

**PRODUCT DESCRIPTION** Stainless Steel Bar, electric arc furnace melted, A.O.D. refined forged, solution annealed and water quenched, lathe turned with saw cut square ends.

**SPECIFICATIONS**

Type 17-4 (UNS S17400) - ASTM A564/A564M-04a, AMS 5643Q, ASTM A705/A705M-95,  
Grade 630 ASME SA-564/SA-564M Including 1998 Winter Addenda,  
ASTM A484/A 484M-03, ASME SA-705/SA-705M Including 1998 Winter Addenda  
and any additional specifications which may be listed below.

**CHEMICAL ANALYSIS**

Heat Number	C	MN	P	S	SI	CR	NI	MO
39789	0.039	0.47	0.020	<0.001	0.54	15.26	4.57	0.20
	CU	CB	TA	CBTA	N	CO	V	
	3.34	0.31	0.01	0.32	0.038	0.04	0.05	

**ITEM DESCRIPTION**

Heat Number	HWRR	Quantity & Weight	Size
39789-4C		1 Bar - 1,530 Lbs.	16.5" Rd. x 161.12" Lg.

**BRINELL/ROCKWELL**

Heat Number	Test	Loc	Brinell
39789-4C	TOP	*	334

**PASS/FAIL TESTS**

Heat Number	Macro	Etch
39789-4C	*	P

<<< TESTS MARKED BY (\*) ARE QUALIFIED BY THE MASTER HEAT >>>

**CAPABILITIES ANALYSIS FOR CONDITION: H900**

The recording of false, fictitious, or  
fraudulent statements or entries on  
the certificate may be punished as  
a felony under federal law, Title 18,  
Chapter 47.

The above are true and correct results  
of tests on samples of the material.  
Results conform to the specification(s)  
listed above and are on record.

HWRR = Minimum HC

By : William A. Deets Date: 11/18/04

Welding: 100% Inspection

Name : William A. Deets

Welding: 100% Inspection

Title: Quality Control Technician

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HWR





ELECTRALLOY

175 Main Street  
Oil City, PA 16301  
PHONE: 814-678-4200  
Fax: 814-678-4146

**MATERIAL CERTIFICATION  
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**CUSTOMER NAME AND ADDRESS**

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Accounts Payable  
P.O. Box 5116  
Southfield, MI 48086-5116

CUSTOMER ORDER NO. C89254

IDENTIFICATION

Heat # 39789

**PRODUCT DESCRIPTION** Stainless Steel Bar, electric arc furnace melted, A.O.D. refined forged, solution annealed and water quenched, lathe turned with saw cut square ends.

**STATEMENTS**

Material Certification conforms to Certificate 3.1.B as in EN 10204.

**COMMENTS**

Part # 408883-7.

The recording of false, fictitious, or fraudulent statements or entries on the certificate may be punished as a felony under federal law, Title 18, Chapter 47.

The above are true and correct results of tests on samples of the material. Results conform to the specification(s) listed above and are on record.

By : William A. Deets Date: 11/18/04

MWRR = Minimum Hot Working Reduction Ratio

Name : William A. Deets

Title: Quality Control Technician



## **Chris Provencal**

**From:** "David Shepherd" <davids@dartaero.com>  
**To:** "Chris Provencal" <chrisp@dartaero.com>  
**Sent:** May 4, 2005 2:48 PM  
**Subject:** Re: D2896-1

The tolerance change that you have requested below is OK.

With respect to the 0.275" chamfer, it will have to be increased to at least 0.315 to be acceptable or we will run into fit problems with the rocker beam.

David

----- Original Message -----

**From:** Chris Provencal  
**To:** David Shepherd  
**Sent:** Wednesday, May 04, 2005 11:53 AM  
**Subject:** D2896-1

There are two D2896-1 supports that they've rejected because of dimension problems:

The problem they picked up on is that the hole is 0.020" to one side (0.010" out of tolerances). It seems to me that its only out on one side of the part, so the hole may be misaligned by that much.

The bigger problem that I noticed is that the chamfer on one side is 0.275" at the top (see picture "support2.jpg", dim should be 0.325).

I will also need an email to approve the tolerance change on the chamfer to 0.325+0.050/-0.010 x 0.075+0.050/-0.010. I believe you already verbally OK'd it when you were here, but I'll need it in writing for the work order.

Sincerely,  
**Chris Provencal**  
**DART Aerospace Ltd.**  
Email...[chrisp@dartaero.com](mailto:chrisp@dartaero.com)  
Phone...613-632-3336  
Fax.....613-632-4443